2026 年度シラバス

科目分類/Subject Categories			
学部等/Faculty	/大学院工芸科学研究科（博士前期課程）：/Graduate School of Science and Technology (Master's Programs)	今年度開講/Availability	/有：/Available
学域等/Field	/独立専攻：/Fibro/BBM	年次/Year	/1～2年次：/1st through 2nd Year
課程等/Program	/先端ファイブロ科学専攻：/Master's Program of Advanced Fibro-Science	学期/Semester	/秋学期：/Fall term
分類/Category	/授業科目：/Courses	曜日時限/Day & Period	/集中：/Intensive

科目情報/Course Information				
時間割番号 /Timetable Number	65119914			
科目番号 /Course Number	65160205			
単位数/Credits	2			
授業形態 /Course Type	講義：Lecture			
クラス/Class				
授業科目名 /Course Title	バイオテクノロジー：Biotechnology			
担当教員名 / Instructor(s)	/WE-TEAM 関係教員：Related teacher of WE-TEAM			
その他/Other	インターンシップ実施科目 Internship	国際科学技術コース提供科目 IGP	PBL 実施科目 Project Based Learning	DX 活用科目 ICT Usage in Learning
	実務経験のある教員による科目 Practical Teacher			
科目ナンバリング /Numbering Code				

授業の目的・概要 Objectives and Outline of the Course	
日	The main goal is to obtain an overview of the characteristic aspects of biotechnology and the application in textile processing. Keywords: Proteins, enzymes, properties, kinetics, micro organisms, cells, immobilisation, stoichiometry, mass transfer, mas
英	The main goal is to obtain an overview of the characteristic aspects of biotechnology and the application in textile processing. Keywords: Proteins, enzymes, properties, kinetics, micro organisms, cells, immobilisation, stoichiometry, mass transfer, mass balances, bioreactors Skills: ・describe differences and similarities between chemical process techn. & bioprocess techn. ・the students will know the general diff between bacteria, viruses, fungi, plant / animal cells ・the students can describe the advantages and disadvantages of immobilisation ・students are able to use models for enzyme kinetics and stoichiometry students can use models for enzyme kinetics, stoichiometry

学習の到達目標 Learning Objectives	
日	Student can describe differences and similarities between chemical process techn. & bioprocess techn. Students will know the general diff between bacteria, viruses, fungi, plant / animal cells Students can describe the advantages and disadvantages of immobilisation Students are able to use models for enzyme kinetics and stoichiometry students can use models for enzyme kinetics

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学習目標の達成度の評価基準 / Fulfillment of Course Goals（JABEE 関連科目のみ）	
日	
英	

授業計画項目 Course Plan			
No.		項目 Topics	内容 Content
1	日	Introduction to Biotechnology	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
	英	Introduction to Biotechnology	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
2	日	Proteins and Enzymes	Relate biotechnological problems to other disciplines, understanding enzymes + characteristics
	英	Proteins and Enzymes	Relate biotechnological problems to other disciplines, understanding enzymes + characteristics
3	日	Enzyme Kinetics	Properties of Enzyme　and Enzyme Kinetics
	英	Enzyme Kinetics	Enzyme Kinetics
4	日	Micro Organisms	Micro Organisms
	英	Micro Organisms	Micro Organisms
5	日	Cells (growth, metabolism)	Cells (growth, metabolism)
	英	Cells (growth, metabolism)	Cells (growth, metabolism)
6	日	Cells (DNA, enzymes)	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
	英	Cells (DNA, enzymes)	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
7	日	Stoichiometry of Growth and Production	Stoichiometry of Growth and Production
	英	Stoichiometry of Growth and Production	Stoichiometry of Growth and Production
8	日	Immobilisation 1	Obtain an understanding of immobilisation 1
	英	Immobilisation 1	Obtain an understanding of immobilisation 1
9	日	Immobilisation 2	Obtain an understanding of immobilisation 2
	英	Immobilisation 2	Obtain an understanding of immobilisation 2
10	日	Stoichiometry of Growth and Production 1	Stoichiometry of Growth and Production 1
	英	Stoichiometry of Growth and Production 1	Stoichiometry of Growth and Production 1
11	日	Stoichiometry of Growth and Production 2	Stoichiometry of Growth and Production 2
	英	Stoichiometry of Growth and Production 2	Stoichiometry of Growth and Production 2
12	日	Enzymes in Textile Processing 1	Present the main steps of biotechnological processes in textile processing 1
	英	Enzymes in Textile Processing 1	Present the main steps of biotechnological processes in textile processing 1
13	日	Enzymes in Textile Processing 2	Present the main steps of biotechnological processes in textile processing 2
	英	Enzymes in Textile Processing 2	Present the main steps of biotechnological processes in textile processing 2

14	日	Wetting and Wicking	Wetting and Wicking
	英	Wetting and Wicking	Wetting and Wicking
15	日	Capillarity and Porosity	Capillarity and Porosity
	英	Capillarity and Porosity	Capillarity and Porosity

履修条件 Prerequisite(s)	
日	
英	

授業時間外学習（予習・復習等） Required study time, Preparation and review	
日	Initial competences: ・Bsc level in mathematics, organic chemistry, physical chemistry, general process engineering, textile technology and materials engineering
英	Initial competences: ・Bsc level in mathematics, organic chemistry, physical chemistry, general process engineering, textile technology and materials engineering

教科書／参考書 Textbooks/Reference Books	
日	Biotechnology in Textile Processing 1st Edition, By Ryszard Kozlowski, Georg M. Guebitz, Artur Cavaco-Paulo, ISBN 9781560221432, Published by CRC Press
英	Biotechnology in Textile Processing 1st Edition, By Ryszard Kozlowski, Georg M. Guebitz, Artur Cavaco-Paulo, ISBN 9781560221432, Published by CRC Press

成績評価の方法及び基準 Grading Policy	
日	End-of-term evaluation Examination methods in case of periodic evaluation during the first examination period: Written Examination Examination methods in case of periodic evaluation during the second examination period: Written Examination During exami
英	End-of-term evaluation Examination methods in case of periodic evaluation during the first examination period: Written Examination Examination methods in case of periodic evaluation during the second examination period: Written Examination During examination period: written closed-book exam

留意事項等 Point to consider	
日	Teaching language is English. Intensive course
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